

Review on Fight with Omicron SARS-CoV-2 variant: Need of hour

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Abstract:

Corona virus disease which was originated in Wuhan back in 2019 has affected badly on public health. Recently, a new variant of same covid 19 has been detected in south Africa and is resulting into increase in the number of cases. WHO designated omicron under the category of variant under monitoring on 24 November 2021 and in next two days on 26 November 2021 the omicron was kept under variant of concern. This variant is having mutations in spike receptor binding sites this variant also shares number of mutation with previously available variant of concern due to which immediately raised global concerns about viral transmissibility and, pathogenicity. Here we described regarding discovery and characteristics of the Omicron variant and the mutations of the spike in the five Variants of concern, and further raised possible strategies to prevent and overcome the war against the omicron virus.

Keywords: "Covid 19", "Omicron", "Variants of concern"

Introduction

Back in December 2019 viral infection rapidly spread to different parts of the world and by the World Health Organization (WHO) in March 2020 declared it as a pandemic and was named as Covid 19. The COVID-19 pandemic has devastated healthcare systems, shut down schools and communities, and plunged the world into an economic recession since then Corona virus disease has been infecting and increasing the cases for almost two years. More than 250 million cases have been confirmed according to data available from world health organization .which includes more than 5 million deaths. The virus which was found in 2019 of Wuhan of China evolved into number of variants. These variants are usually the products of recombination, selection pressure, and point mutations & in order to classify the virus for ease of diagnosis and treatment virus was classified into three different categories by World health organization. Variants of concern (VOCs), variants of interest (VOIs), variant under monitoring (VUMs). The novel Corona virus since its infection from back in 2019, it has evolved into four different forms of variants of concern were alpha, beta, gamma, delta that resulted into a new wave of covid 19 infection. On 26 November 2021, a new variant of corona virus was evolved and which was named Omicron and it was designated as the fifth VOC by WHO, which immediately raised global concerns. The genomic analysis of SARS-CoV2 variants reveals that Omicron is a lot different from the previously evolved covid variants. It is quoted that new variant of concern of covid omicron might have

been gestated in immuno compromise patients.

Material and Methods

A review of the latest literature until December, 2021 was made. Studies published in English and available as full-text publications are included. The data was collected from the E journals like Scopus , web of science and Google Scholar platforms using the following keywords: "SARS-COV19", "corona virus " , "Omicron". Original and review papers were referred too, whereas letters to the editor and preprints were excluded. After reading abstracts of 15 papers that met the adopted criteria, were selected for analysis

Discussion & Results :

Emergence of Omicron Variant

According to data revealed by who the first infection of omicron was reported back in November of 2021 The first genomic sequence of omicron is available, however, was from a specimen collected back in November 2021, in Botswana. Since the identification of first case of omicron its infection appears to be spread rapidly. The average number of COVID-19 cases per day increased from 280 to 800 after the identification of omicron variant this number exceeded 2000 on November 26, 2021, and broke through 10,000 on December 3, 2021. In addition, tracing the source of COVID-19 cases revealed that had probably spread in Western Europe before the first cases were detected in southern region of Africa. The variant was firstly reported to WHO on November 24, 2021, initially world health organization kept it under the class of variant under monitoring,

within time span of two days world health organization designated it as a variant of concern. A few days after the identification of Omicron in Africa, the variant has emerged in the different parts of world. According to the latest available statistics from the COVID tracking programme as of December 7, 2021, 697 Omicron cases have been confirmed worldwide. However, the actual figures may be more than the recorded numbers and these numbers might increase tremendously in the coming days. The scientist across the world has raised concerns about the emergence of the Omicron variant due to the large number of mutations as compared to the previously reported VOCs. A total of 32 mutations have been detected in the spike protein alone compared to the 16 mutations in the previously evolved highly infectious Delta variant. It is believed that the Omicron variant could be three times more infectious than the original SARS-CoV-2 strain. The recent studies of the Omicron variant resulted into certain deletions as well as a significant number of mutations, some of which overlap with those found in the previously evolved virus of concerns Alpha, Beta, Gamma, and Delta. Such kind of deletions and mutations has been well-known for increasing viral transmissibility and binding affinity of omicron.

Characteristics of Omicron variant

Since late 2019, big waves of COVID-19 outbreaks have been recorded in different parts of the world the origin centers for the waves were from different parts of world but recent wave began from South Africa. First two waves were due to alpha, beta, and delta of covid mutants. (He, 2021)The

infection percentage of the Delta variant, however, rise to ~80% during the same period of time, this indicates higher transmissibility for Delta than for the Beta variant. The rate of transmission of Omicron infection reached ~90% within approximately 25 days in South Africa. Same is the principle behind the rate of doubling rate of these variants. Doubling time of the Beta, Delta, and Omicron variants was found to 1.7, 1.5, and 1.2 days, respectively. These figures clearly indicate that omicron is more infective and transmissible as compared to earlier known variants of covid like alpha, beta and delta. The genome analysis has shown a high number of non-synonymous mutations in the spike proteins that involve their role in the transmissibility, immune infection and disease severity. (He, 2021) Overall, more than 60 substitutions have been identified in the Omicron variant. In comparison to those observed in the earlier covid variant of concern variants, the spike mutations identified in Omicron outnumber by about 3–4 times. These mutations have been indicated in higher binding affinity with ACE2, enhanced transmissibility and pathogenicity, and reduced ability of neutralization by monoclonal antibodies and also by use of vaccines.

Strategies for prevention of infection and transmission of omicron variant

Omicron might have evolved with the capacity of easier spread and transmit among people and the ability to resist currently available antibody treatments. This indicates the importance of maintaining public health prevention measures like wearing masks, keeping physical distance,

and washing of hands. These measures helped human to disrupt the infection chain in earlier variants and will to fight with omicron as well. Along with this early identification and diagnosis of infection and timely quarantine are key factors that can minimize virus transmission during a pandemic. Currently used diagnostic test are not useful to detect the omicron infection so it is important to develop the diagnostic technique that can identify the omicron variant infection. This will help to cutoff the chain of omicron infection as well. The omicron wave that began from the Africa region highlights the importance of vaccination, as Africa is running their vaccination campaign with very slow rate of vaccination. Although the authorized COVID-19 vaccines showed decreased effectiveness against the variant viruses but results also shows that the omicron infect the vaccinated people too but they get infect with mild disease and can beat the virus infection. Vaccines play important role in preventing severe diseases, hospitalization, and death. Several studies shows that the serum neutralizing antibodies dramatically decline 6months post-vaccination and that further vaccination with an extra booster dose can restore and even improve the vaccine effectiveness therefore, it is believed that adding an extra boosting dose of the COVID-19 vaccine to the vaccination program could undoubtedly help bring a control on the Omicron spread and infection.

Conclusion

As like origin of covid emergence the rise of omicron remains a open question regarding its origin transmission capacity, and the

decreased neutralizing capacity of vaccine and developed monoclonal antibodies against it. New variant may also evolve from omicron as well, due to continue development of new variants of covid has made the fight against it very complicated. Fortunately with very much developed technology and with global unity along with information sharing we can definitely win the war against the virus

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Author contribution

Rohit Kale: Conceptualization, Data study, Visualization, Writing - Original Draft, Writing - review & editing.

Shrikant Solanke: Data study, Visualization, Writing - Original Draft, Writing - review & editing.

Declaration of competing interest

All authors report no conflicts of interest relevant to this article.

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